

## MITOSIS

To identify cells in the four phases of mitosis and to calculate the rate of cell growth.

microscope  
prepared slides of onion root tip  
lens paper  
prepared slides of whitefish blastula

- 1 Obtain an onion root tip slide and place it on the stage of your microscope. View the slide under low power magnification. Focus using the coarse adjustment.

- 2 Center the root tip and then rotate the nosepiece to the medium-power objective lens. Focus the image using the fine-adjustment focus. Observe the cells near the root cap. This area is referred to as the *meristematic* region of the root.

- 3** Move the slide away from the root tip and observe the cells. These are the mature cells of the root.

- a)** How do the cells of the meristematic area differ from the mature cells of the root?

- 4 Return the slide to the meristematic area and center the root tip. Rotate the nosepiece to the high-power objective lens. Use the fine adjustment to focus the image.

- 5** Locate and observe cells in each of the phases of mitosis. It will be necessary to move the slide to find each of the four phases. Use the pictures on the previous pages as guides.

- b)** Draw, label, and title each of the phases. It is important to draw and label only the structures that you can actually see under the microscope.

- 6** Return your microscope to the low-power objective lens and remove the slide of the onion. Place the slide of the

whitefish embryo on the stage and focus, using the coarse adjustment. Repeat the procedure that you followed for the onion and locate dividing animal cells under high-power magnification.

- c)** Compare the appearance of the animal cells with that of the plant cells.

**7** Count 20 adjacent whitefish embryo cells and record whether the cells are in interphase or are dividing.

- d) Cells in interphase** = \_\_\_\_\_

Cells actively dividing = \_\_\_\_\_

- e) Calculate the percentage of cells that are undergoing mitosis:

$$\frac{\text{Number of cells dividing}}{20} \times 100 = \underline{\hspace{1cm}} \% \text{ dividing}$$

- 8** Repeat the same procedure for the meristematic region of the plant cell.

- f) Cells in interphase** =

Cells actively dividing = \_\_\_\_\_

- g)** Calculate the percentage of cells that are undergoing mitosis:

$$\frac{\text{Number of cells dividing}}{20} \times 100 = \underline{\hspace{1cm}} \% \text{ dividing}$$

- h)** Compare the percentage of animal cells that are undergoing mitosis with the percentage of plant cells that are undergoing mitosis.

**1** Predict what will happen if both sister chromatids move to the same pole during mitosis.

- 2 A cell with 10 chromosomes undergoes mitosis. Indicate how many chromosomes would be expected in each of the daughter cells.
- 3 Predict what will happen if a small mass of cells breaks off from a human blastula.
- 4 Herbicides like 2,4-D and 2,4,5-T stimulate cell division. Why does the stimulation of cell division make these chemicals effective herbicides?